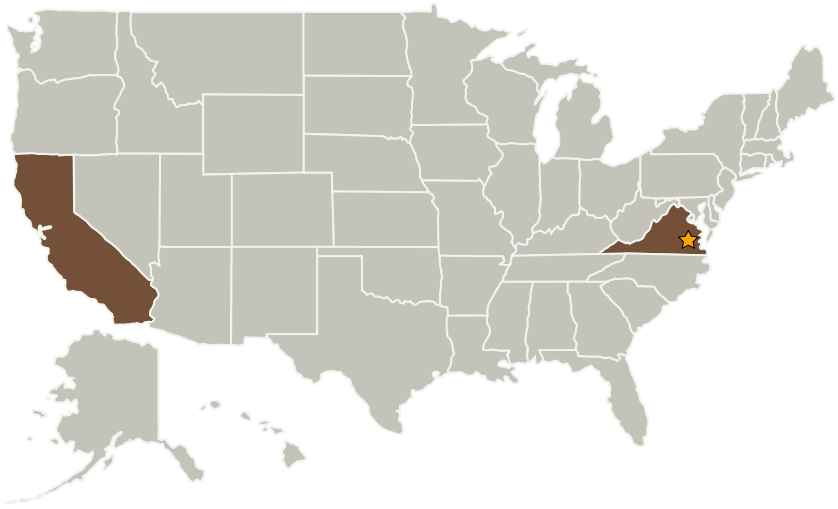
High Energy Single Frequency Fiber Laser at Low Repetition Rate, Phase I

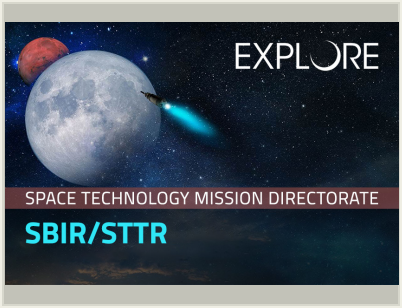
Completed Technology Project (2008 - 2008)

Project Introduction

This SBIR phase I project proposes a tunable single frequency high energy fiber laser system for coherent Lidar systems for remote sensing. Current state-of-art technologies can not provide all features of high energy and efficiency, compactness, narrow linewidth, super frequency and power stability, low noise, and high extinction ratio at the same time. PolarOnyx proposes, for the first time, a high energy (100 mJ) single frequency (< 1 KHz) PCF fiber laser transmitter to meet with the requirement of solicitation. This proposal is based on the spectral shaping sub-mJ fiber laser we have achieved in our labs. In the high power amplifier stage, PolarOnyx proposes an innovative fiber based regenerative amplifier approach by employing our patent pending proprietary technologies in fiber lasers, that will be able to operate at low repetition rate (10 Hz to 1 kHz) and reach high energy level of 100 mJ. These will make the fiber laser transmitter system superior in terms of wall plug efficiency (over 30%), energy(100 mJ), noise, size, and cost. A tabletop experiment will be demonstrated in Phase I time frame for proof of concept. A compact prototype will be delivered in Phase II.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Polaronyx, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	San Jose, California

Primary U.S. Work Locations	
California	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jian Liu

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers